

## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) Hydroxyapatite (HA) incorporating an alpha-emitting radionuclide selected from the group consisting of  $^{211}\text{At}$ ,  $^{212}\text{Bi}$ ,  $^{223}\text{Ra}$ ,  $^{224}\text{Ra}$ ,  $^{225}\text{Ac}$ , and  $^{227}\text{Th}$  or an *in vivo* generator for an alpha-emitting radionuclide selected from the group consisting of the beta-emitting radionuclides  $^{212}\text{Pb}$ ,  $^{211}\text{Pb}$ ,  $^{213}\text{Bi}$ , and  $^{225}\text{Ra}$ , wherein the HA substantially retains the daughter nuclide after decay of the parent nuclide.

2-4. (Cancelled)

5. (Previously Presented) Hydroxyapatite according to claim 1, wherein the HA comprises a cation that is bivalent or trivalent or a mixture of such cations.
6. (Original) Hydroxyapatite according to claim 5 wherein the cation is chosen from the group consisting of calcium, strontium, barium, bismuth, yttrium, lanthanum, lead or mixtures thereof.
7. (Previously Presented) Hydroxyapatite according to claim 1, wherein the HA is particulate and has a size in the range of 1 nm to 100  $\mu\text{m}$ .
8. (Original) Hydroxyapatite according to claim 7 wherein the HA has a size in the range of 1  $\mu\text{m}$  to 20  $\mu\text{m}$ .
9. (Previously Presented) Hydroxyapatite according to claim 1, wherein the HA is surface modified with amino acids, peptides, proteins, antibodies, carbohydrates, phosphonates, fluorine, magnetic substances, folate groups or a combination thereof.

10. (Previously Presented) Hydroxyapatite according to claim 1, wherein the HA is combined or co-sedimented with a substance selected from the following group: metals, oxides, proteins, amino acids, carbohydrates, phosphonates including bisphosphonates or organic compounds.
11. (Previously Presented) Hydroxyapatite according to claim 1, wherein the HA is combined or co-sedimented with a substance selected from polylactide, polyethyleneketones, glass-ceramics, titania, alumina, zirconia, silica, polyethylene, epoxy, polyethyleneglycol, polyhydroxybutyrate, gelatin, collagen, chitosan, phosphazene, iron, iron oxides, magnetic iron or mixtures thereof.
12. (Withdrawn) A process for preparing a hydroxyapatite according to claim 1, said process comprising:
  - (a) contacting a solution of an alpha-emitting radionuclide selected from the group consisting of  $^{211}\text{At}$ ,  $^{212}\text{Bi}$ ,  $^{223}\text{Ra}$ ,  $^{224}\text{Ra}$ ,  $^{225}\text{Ac}$ , and  $^{227}\text{Th}$  or an *in vivo* generator of an alpha-emitting radionuclide selected from the group consisting of the beta-emitting radionuclides  $^{212}\text{Pb}$ ,  $^{211}\text{Pb}$ ,  $^{213}\text{Bi}$ , and  $^{225}\text{Ra}$  with hydroxyapatite particulates; and
  - (b) optionally crystallizing a coating of hydroxyapatite on the labeled particulates prepared in step (a) whereby to encapsulate said radionuclide or said *in vivo* generator in the particulate.
13. (Withdrawn) A process as claimed in claim 12 wherein step (a) is carried out at a pH in the range 3-12.
14. (Withdrawn) A process as claimed in claim 12 or claim 13 wherein said *in vivo* generator of an alpha-emitting radionuclide is  $^{212}\text{Pb}$  and, prior to steps a) and b), said method additionally comprises;

- i) Preparing  $^{224}\text{Ra}$ ,
  - ii) Purifying the  $^{224}\text{Ra}$  by contact with an f-block specific binder ,
  - iii) Allowing ingrowth of  $^{212}\text{Pb}$ , and
  - iv) Purifying the resulting  $^{212}\text{Pb}$  by contact with a lead-specific binder
15. (Previously Presented) A pharmaceutical composition comprising a hydroxyapatite as claimed in claim 1 and a physiologically acceptable carrier.
16. (Original) A pharmaceutical composition according to claim 15 in liquid, injectable form.
17. (Original) A pharmaceutical composition according to claim 15 in gel form.
- 18-23. (Cancelled)
24. (Withdrawn) A method of radiochemical treatment of a human or non-human animal subject in need thereof, said method comprising administering to said subject an effective amount of a hydroxyapatite as claimed in claim 1 or of a composition as claimed in claim 15.
25. (Withdrawn) A method as claimed in claim 24 for the treatment of an intracavitory primary or metastatic tumor.
26. (Withdrawn) A method as claimed in claim 24 for radiosynovectomy.
27. (Withdrawn) A method as claimed in claim 24 for intratumor therapy.
28. (Withdrawn) A method as claimed in claim 24 for anticancer therapy.
29. (Withdrawn) A method as claimed in claim 24 for anticancer treatment and/or sterilization of tumor bed and optionally the cavity in the case of an intracavitory

tumor, wherein said administration is effected after surgical removal of at least part of a tumor.